REMARKS

Claims 5 and 7-12 are pending in this application. Claim 5 has been withdrawn from consideration as being drawn to a non-elected invention. Claims 1-4 and 6, have been canceled without prejudice or disclaimer.

Canceled claims 1-4 and 6 have been rewritten as new claims 7-11 to more clearly define the invention. No new matter has been added.

In view of the amendments to the claims and remarks set forth below, further and favorable reconsideration is respectfully requested.

I. At page 3, paragraph 5, of the Office Action, claims 1-4 and 6, have been rejected under 35 USC § 103(a), as being unpatentable over Zhang et al. "Study of Resistance Against Photorefractive Light-Induced Scattering in $LiNbO_3$:Fe, Mg Crystals".

The Examiner states that it would have been obvious to the skilled artisan to meet the stoichiometric values of the congruent composition as well as the mole percentage of Zn and In, because Zhang clearly teaches a $LiNbO_3$:Fe composition doped with magnesium, indium or zinc as a three-dimensional optical storage material, and where the Mg mole ratio is at least 4.6 mol%.

Zhang discloses $LiNbO_3$:Fe, Mg and $LiNbO_3$:Fe, Zn crystals. Mg is present in an amount of from 2.0 to 6.0 mol%, preferably 4.0 to 6.0 mol%. Zhang discloses In doped $LiNbO_3$, but does not disclose $LiNbO_3$:Fe, In.

In view of the following, this rejection is respectfully overcome.

When writing photorefractive grating, the present crystals have high diffraction efficiencies (more than 68%), fast response speeds of photorefraction (3~5 sec), and high resistance to optical scattering. When the diffraction efficiency of the Zhang crystals reach the value of the present

crystals, the response time of their crystals is more than 35 sec, which is one order of magnitude longer than that of the present crystals. The fastest response time of the crystals of Zhang et al. is 15 sec, which is 3~5 times longer than that of the present crystals. In that time, the diffraction efficiency of the Zhang crystals is just about 15%, which is more than 4 times smaller than that of the present crystals. Therefore, the present crystals acheive superior results as compared to the results achieved by Zhang et al.

Zhang et al. discloses different doping concentrations of Mg, but only in single doping concentration of Fe. Further, Zhang is silent as to the change of [Li]/[Nb] ratios of their crystals. In the present invention, a range of the doping concentrations of Mg and Fe, and the [Li]/[Nb] ratios are disclosed. Thus, the present crystals achieve good properties in hologram storage. Because the properties of $LiNbO_3$ crystals have a direct relationship with their compositions, the crystals of Zhang et al. do not have sufficiently good crystal properties. That is the reason why the application results achieved by the crystals of Zhang et al. are poor. The present crystals provide superior results.

Though Zhang et al. mentioned that they have observed the resistance of light-induced scattering in $LiNbO_3$:Fe,Zn crystals, Zhang is silent as to the diffraction efficiency and response time of these crystals. When used as hologram storage, the ability to resist light-induce scattering is not enough, the diffraction efficiency and response time are the most important characteristics of photorefractive crystals. The present $LiNbO_3$:Fe, Zn crystals not only have high resistance to light-induced scattering but also have high diffraction efficiencies and response times. These results prove the present $LiNbO_3$:Fe,Zn crystals are good photorefractive hologram storage materials.

Zhang is silent as to the doping concentration of Zn. In the present invention, a range of Zn

doping concentrations is disclosed. Comparing the doping concentrations of Mg and Zn in this invention, it can be seen that they are different. The doping concentration of Zn of Zhang must be demonstrated, and cannot be simply deduced.

In the introduction of Zhang et al., they disclose that only $LiNbO_3$:In crystals have been studied as photorefractive resistance materials. It is well know that the hologram storage in $LiNbO_3$ crystals makes use of the photorefraction only. Zhang et al. do not suggest that $LiNbO_3$:Fe crystals are suitable for use as photorefractive hologram storage materials. Furthermore, Zhang et al. do not suggest suitable doping concentrations of In.

Zhang et al. do not teach or suggest a doubly doped crystal where the second metal is In, let alone the present crystal having the claimed stoichiometric properties.

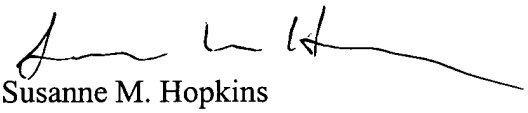
In view of the new claims and the remarks set forth above, it is submitted that nothing in Zhang et al. renders the claimed invention obvious within the meaning of 35 USC § 103(a). Accordingly, the Examiner is respectfully requested to withdraw this rejection.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP



Susanne M. Hopkins
Attorney for Applicants
Reg. No. 33,247

SMH/plb
Atty. Docket No. **010737**
Suite 1000
1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930

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